



MS APPEAL BRIEF - PATENTS
Docket No.: 3673-0163P
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Takeshi ASAKURA

Application No.: 10/743,283

Confirmation No.: 7867

Filed: December 23, 2003

Art Unit: 3713

For: BALL TRAJECTORY MEASURING
APPARATUS

Examiner: WILLIAMS, Ross A

**APPEAL BRIEF ON BEHALF OF APPELLANT
UNDER 37 C.F.R. § 41.37**

MS APPEAL BRIEF - PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

This is an Appeal from the Office Action of July 13, 2006 finally rejecting claims 1, 2, 4, 5 and 7-12 in the above-identified application. The appealed claims are 1, 2, 4, 5 and 7-12, and are set forth in the attached Appendix. A Notice of Appeal was filed on October 13, 2006.

The fees required under § 41.20(b)(2) are dealt with in the accompanying
TRANSMITTAL OF APPEAL BRIEF.

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This brief contains items under the following headings as required by 37 C.F.R. §

41.37 and M.P.E.P. § 1205.02:

- I. Real Party In Interest
- II Related Appeals and Interferences
- III. Status of Claims
- IV. Status of Amendments
- V. Summary of Claimed Subject Matter
- VI. Grounds of Rejection to be Reviewed on Appeal
- VII. Argument
- VIII. Claims

Appendix A: Claims

I. REAL PARTY IN INTEREST

The instant application is assigned to SRI SPORTS LIMITED, as recorded May 16, 2005, at Reel/Frame 016561/0471. No further assignments of this application have been made. Therefore, the real party in interest is SRI SPORTS LIMITED.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences for the instant application.

III. STATUS OF THE CLAIMS

Claims 1, 2, 4, 5 and 7-12 are pending in this application and are finally rejected.
Claims 3 and 6 have been canceled.

IV. STATUS OF AMENDMENTS

No Amendments have been made in the present application since receipt of the final Office Action dated July 13, 2006.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claims 1, 2 and 9

Independent claim 1 is directed to a ball trajectory measuring apparatus (page 1, lines 3-4 and Figure 1). The ball trajectory measuring apparatus includes a first camera (1) for photographing a flying ball (G) from a back of the flying ball (page 5, line 24, page 10, line 5, and Figures 1-3), a second camera (2) having an angle of view related to that of the first camera (1) and serving to photograph the back of the flying ball (G) later than the first camera (1)(page 5, line 25, page 10, line 6, and Figures 1-3) and a third camera (3) for photographing a front of the flying ball (G) (page 5, line 25, page 10, line 7, and Figures 1-3). The ball trajectory measuring apparatus also includes a control portion (4) for controlling photographing timings of the first (1), second (2) and third (3) cameras (page 5 line 34 through page 6, line 7 and Figure 1) and a calculating portion (5) for calculating position coordinates of the ball based on image data obtained by the first (1), second (2) and third (3) cameras, and based on position coordinates, directions of optical axes and angles of view of the respective cameras (page 6, lines 8-21 and Figure 1). The angle of view of the first camera (1) partially overlaps with that of the second camera (2)(page 7, lines 14-16, page 10, lines 13-15, and Figures 2 and 3), the angle of

view of the second camera (2) is related to that of the first camera (1) based on ball images which are simultaneously photographed by the first camera (1) and the second camera (2)(page 8, lines 22-32, page 10, lines 15-16 and Figures 2 and 3) and a correspondence of the coordinates in the angle of view of the first camera (1) to those in the angle of view of the second camera (2) is grasped by the calculating portion (page 8, lines 22-32).

Claims 4, 5, 8 and 10

Independent claim 4 is directed to a ball trajectory measuring apparatus (page 1, lines 3-4). The ball trajectory measuring apparatus includes a first camera (4) for photographing a front of a flying ball (G)(page 12, line 30 and Figure 4), a second camera (5) having an angle of view related to that of the first camera (4) and serving to photograph the front of the flying ball (G) earlier than the first camera (4)(page 12, line 31 and Figure 4) and a third camera (6) for photographing a back of the flying ball (page 12, line 31 and Figure 4). The ball trajectory measuring apparatus also includes a control portion (4) for controlling photographing timings of the first (4), second (5) and third (6) cameras (page 5 line 34 through page 6, line 7 and Figure 1) and a calculating portion (5) for calculating position coordinates of the ball based on image data obtained by the first (4), second (5) and third cameras (6), and based on position coordinates, directions of optical axes and angles of view of the respective cameras (page 6, lines 8-21 and Figure 1). The angle of view of the first camera (4) partially overlaps with that of the second camera (5)(page 13, lines 7-9 and Figure 4), the angle of view of the second camera (5) is related to that of the first camera (4) based on ball images which are simultaneously

photographed by the first camera (4) and the second camera (5)(page 13, lines 9-10), and a correspondence of the coordinates in the angle of view of the first camera (4) to those in the angle of view of the second camera (5) is grasped by the calculating portion (5) (page 8, lines 22-32).

Claims 7, 11 and 12

Independent claim 7 is directed to a ball trajectory measuring apparatus (page 1, lines 3-4 and Figure 1). The ball trajectory measuring apparatus includes a first camera (1) for photographing a flying ball (G) from a back of the flying ball (page 5, line 24 and Figures 1-2), a second camera (2) having an angle of view related to that of the first camera (1) and serving to photograph the back of the flying ball (G) later than the first camera (1)(page 5, line 25 and Figures 1-2) and a third camera (3) for photographing a front of the flying ball (G) (page 5, line 25 and Figures 1-2). The ball trajectory measuring apparatus also includes a control portion (4) for controlling photographing timings of the first (1), second (2) and third (3) cameras (page 5 line 34 through page 6, line 7 and Figure 1) and a calculating portion (5) for calculating position coordinates of the ball based on image data obtained by the first (1), second (2) and third (3) cameras, and based on position coordinates, directions of optical axes and angles of view of the respective cameras (page 6, lines 8-21 and Figure 1). The angle of view of the first camera (1) partially overlaps with that of the second camera (2)(page 7, lines 14-16 and Figure 2), the angle of view of the second camera (2) is related to that of the first camera (1) based on ball images which are simultaneously photographed by the first camera (1) and the second camera (2)(page 8, lines 22-32 and Figure 2). Furthermore, the first

camera (1) and the second camera (2) are located at substantially the same distance, at the same elevation and directly behind the launch point, and the first (1) and second (2) cameras are inclined upward from a horizontal direction, and an angle of inclination of said first camera (1) is greater than an angle of inclination of said second camera (2)(page 6, line 33 through page 7, line 11).

VI. GROUNDS OF REJECTION

Claims 1 and 4 stand rejected under 35 U.S.C. § 102(e) as being anticipated by Lutz et al., U.S. Patent No. 6,592,465.

Claims 2, 5 and 7-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lutz et al., U.S. Patent No. 6,592,465 in view of Nauck, U.S. Patent No. 5,413,345.

VII. APPELLANT' ARGUMENTS

1. Rejection of claims 1 and 4 under 35 U.S.C. §102(e) as being anticipated by Lutz et al., U.S. Patent No. 6,592,465

Claims 1 and 4

Independent claims 1 and 4 recite a combination of elements including "a calculating portion for calculating position coordinates of the ball based on image data obtained by the first, second and third cameras, and based on position coordinates,

directions of optical axes and angles of view of the respective cameras." In addition, independent claims 1 and 4 recite "wherein the angle of view of the first camera partially overlaps with that of the second camera, the angle of view of the second camera is related to that of the first camera based on ball images which are simultaneously photographed by the first camera and the second camera, and a correspondence of the coordinates in the angle of view of the first camera to those in the angle of view of the second camera is grasped by the calculating portion." Appellant respectfully submits that Lutz et al. fails to anticipate independent claims 1 and 4 of the present invention.

In independent claims 1 and 4, coordinates in the angle of view of the first camera are related to those of the second camera based on the ball images. In other words, after photographing by the cameras, the correspondence of the coordinates is grasped. This can be understood because claims 1 and 4 recite "the angle of view of the second camera is related to that of the first camera based on ball images," "a correspondence of the coordinates in the angle of view of the first camera to those in the angle of view of the second camera is grasped by the calculating portion" and "a calculating portion for calculating position coordinates of the ball based on image data obtained by the first, second and third cameras, and based on position coordinates, directions of optical axes and angles of view of the respective cameras."

The Examiner takes notice of column 9, lines 8 to 30 of Lutz et al., U.S. Patent No 6,592,465 (hereinafter "Lutz et al."). However, this part of Lutz et al. does not disclose to relate coordinates based on the ball images as recited in independent claims 1 and 4.

Referring to column 6, line 29 to column 8, line 30 of Lutz et al., in the measuring method of Lutz et al., the coordinates of poles located at points P1 to P12 are related to the coordinates in the angle of view based on the positions of the poles. In other words, before photographing by the cameras, the correspondence of the coordinates is grasped.

The angle of view of the cameras can be shifted due to wind, shaking or deformed ground. In Lutz et al., shifting inhibits accurate measuring because the correspondence of the coordinates is grasped before photographing by the cameras. In the present invention, even if the angle of view of the cameras is shifted, accurate measuring is carried out because the correspondence of the coordinates is grasped after photographing by the cameras.

When photographing balls with high trajectory, cameras are required to have high angles of view. In Lutz et al., when the angle of view is high, the correspondence of the coordinates is not grasped because the poles are not included in the angle of view. In the present invention, even if the angle of view is high, the correspondence of the coordinates is grasped because the correspondence is based on ball images.

Since the Lutz et al. reference fails to disclose relating the coordinates in the angle of view of one camera to the coordinates in the angle of view of another camera based on the ball images, Appellant respectfully submits that the Lutz et al. reference fails to anticipate independent claims 1 and 4 of the present invention for at least this reason. Reconsideration and reversal of the Examiner's rejection of claims 1 and 4 under 35 U.S.C. § 102(e) in view of the Lutz et al. reference are respectfully requested.

In addition, in Lutz et al., there is no description with regard to the calculating portion using "angles of view of the respective cameras" to calculate position coordinates

of the ball as in the presently claimed invention. Referring to page 8, lines 22-32 of the present specification, the above aspect of the present invention is further described. Specifically, it is described that the first camera and the second camera are synchronized with each other. In addition, it is described that the angle of view of the first camera and the angle of view of the second camera are related to each other based on data of the ball images. In addition, the coordinates in the angle of view of the first camera to those in the angle of the second camera is grasped by the calculating portion (see page 8, lines 30-32 of the present specification). The calculating portion then uses the position coordinates, directions of optical axes and angles of view of the respective cameras, which are based on the ball images, to calculate position coordinates of the flying ball.

Since the Lutz et al. reference fails to disclose a calculating portion that uses the angles of view of the respective cameras that are related based on the ball images to calculate the position of the ball, Appellant submits that Lutz et al. fails to anticipate independent claims 1 and 4 for this additional reason. Reconsideration and reversal of the Examiner's rejection of independent claims 1 and 4 under 35 U.S.C. § 102(e) in view of the Lutz et al. reference are therefore respectfully requested.

Claim 4

In addition to the above, claim 4 recites “a first camera for photographing a front of a flying ball” and “a second camera having an angle of view related to that of the first camera and serving to photograph the front of the flying ball earlier than the first camera.” Furthermore, claim 4 recites “the angle of view of the second camera is related to that of the first camera based on ball images which are simultaneously photographed by the first

camera and the second camera.” In the Examiner’s final Office Action, the Examiner has not explained which two cameras are considered to be the first and second cameras that each photograph the front of the ball, and are related to each other based on the ball images that are photographed at the same time.

Referring to Figure 1 of Lutz et al., to the extent the Examiner considers the cameras 12d and 12c to be the first and second cameras (since the first and second cameras in claim 4 require that the front of the ball be photographed), respectively, at the location where these two cameras overlap, only the camera 12d would be photographing the front of the ball. The camera 12c would only photograph the front of the ball at a location outside the range of the camera 12d. In view of this, the cameras 12c and 12d are not related to each other based on the ball images, which are simultaneously photographed by the first and second cameras. Therefore, Appellant respectfully requests that the Examiner’s rejection of claim 4 under 35 U.S.C. § 102(e) in view of Lutz et al. be reconsidered and reversed for this additional reason.

2. Rejection of claims 2, 5 and 7-12 under 35 U.S.C. §103(a) as being unpatentable over Lutz, U.S. Patent No. 6,592,465 in view of Nauck, U.S. Patent No. 5,413,345

Claim 2

It is respectfully pointed out that claim 2 is dependent on independent claim 1 and is therefore allowable due to its dependence on independent claim 1 for the above-mentioned reasons with regard to claim 1.

In addition, claim 2 recites "wherein the first camera is positioned behind a ball launch point, the second camera is positioned between the launch point and a drop point, and the third camera is positioned after the drop point." Appellant respectfully submits that the Lutz et al. and Nauck references fail to render obvious claim 2 of the present invention.

As admitted by the Examiner, Lutz et al. does not disclose the orientation of the first, second and third cameras in relation to the launch and drop points (see page 4, lines 6-8 of the Examiner's final rejection). However, the Examiner relies on Nauck to modify Lutz et al. to arrive at the present invention as recited in dependent claim 2. Appellant respectfully submits that the combination of references relied on by the Examiner fail to teach or suggest the present invention as recited in dependent claim 2. Independent claim 1 recites "a third camera for photographing a front of the flying ball." In addition, claim 2 recites "the third camera is positioned after the drop point." In view of this, claim 2 requires that the third camera be "positioned after the drop point" and be "for photographing a front of the flying ball." Appellant respectfully submits that Nauck fails to disclose this aspect of the present invention and therefore, the combination of Lutz et al. and Nauck also fail to disclose this aspect of the present invention.

Referring to the Nauck reference, each of the cameras 21-25 is located in the target area. However, none of the cameras of Nauck are for photographing the front of a ball that drops short of a particular golf green (A-K). For example, referring to Figure 1 of Nauck, if a golfer were to hit a ball at the golf green A, the cameras 30, 31 and 32 would photograph the back of the ball and the camera 21 would photograph the side of the ball. However, the cameras 22-25, which are located after the drop point of the ball

would not photograph the front of the ball, because each of these cameras is located too far down stream to photograph the front of the ball. Since Nauck fails to disclose a camera that is located after the drop point and photographs the front of a ball, Appellant respectfully submits that the combination of Lutz et al. and Nauck fails to teach or suggest the present invention as recited in dependent claim 2. Reconsideration and reversal of the Examiner's rejection of claim 2 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are therefore respectfully requested.

In addition, Appellant respectfully submits that the Examiner has not established a *prima facie* case of obviousness. Referring to MPEP 2143, the following is stated:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined, must teach or suggest all the claim limitations.

Appellant respectfully submits that the Examiner has failed to meet his burden in establishing a *prima facie* case of obviousness, since the Examiner has not provided any suggestion or motivation to modify the combination of references relied on. The Examiner must first establish a *prima facie* case of obviousness before the burden shifts to Appellant to rebut the *prima facie* case of obviousness. The Examiner is shifting the burden to Appellants to prove non-obviousness without first establishing obviousness.

Referring to paragraph 4 of MPEP 2142, the Examiner is placed with the initial burden "to provide some suggestion of the desirability of doing what the inventor has done." The Examiner must show that the references expressly or impliedly suggest the claimed invention or a convincing line of reasoning should be set forth as to why the

modification is obvious. The Examiner has provided no suggestion or convincing line of reasoning in the present case. Accordingly, the Examiner's burden has not been satisfied.

Specifically, the Examiner's entire rationale for modifying the Lutz et al. reference is as follows:

... Nauck also discloses that the locator cameras can be placed at any convenient golf location from which a golf shot can be viewed (Nauck 3:35-37). Thus by combining the teachings of Nauck to Lutz an apparatus could be constructed to have various camera arrangements in relations to the launch and drop points on the golf area. (Examiner's final rejection, page 4, lines 13-17)(emphasis added).

Appellants submit that the fact that the cameras "can" be located at any convenient location and the fact that the Lutz et al. apparatus "could" be constructed in the manner suggested by the Examiner is insufficient to establish a *prima facie* case of obviousness. The references must suggest the desirability of the combination. The Examiner is directed to MPEP 2143.01 paragraph III, entitled "Fact that References Can be Combined or Modified is not Sufficient to Establish *Prima Facie* Obviousness," which discusses the need for a suggestion to modify a particular teaching.

At page 4, last paragraph of the Examiner's final rejection, the Examiner states the following:

One of ordinary skill in the art would be motivated to modify Lutz in view of Nauck to provide various camera arrangements with respect to the layout of the golf course and the launch and drop points. This would provide greater flexibility in setting up the tracking cameras on the golf course due to the fact that the system can be adapted to many different courses that are not of an identical layout.

However, this teaching does not appear in the Lutz et al. or Nauck references. In addition, Neither of the Lutz et al. and Nauck references disclose providing a camera down stream of the drop point, which is for photographing the front of ball. In view of

this, this statement by the Examiner is insufficient to establish a *prima facie* case of obviousness.

Since the Examiner has not established a *prima facie* case of obviousness, Appellants respectfully request reconsideration and reversal of the Examiner's rejection of claim 2 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references.

Claim 5

At the outset, it is respectfully pointed out that claim 5 is dependent on independent claim 4 and is therefore allowable due to its dependence on independent claim 4 for the above-mentioned reasons with regard to independent claim 4.

In addition, claim 5 recites "wherein the first camera is positioned after a ball drop point, the second camera is positioned between a launch point and the drop point, and the third camera is positioned behind the launch point." Appellant respectfully submits that the Lutz et al. and Nauck references fail to render obvious claim 5 of the present invention.

As admitted by the Examiner, Lutz et al. does not disclose the orientation of the first, second and third cameras in relation to the launch and drop points (see page 4, lines 6-8 of the Examiner's final rejection). However, the Examiner relies on Nauck to modify Lutz et al. to arrive at the present invention as recited in dependent claim 5. Appellant respectfully submits that the combination of references relied on by the Examiner fail to teach or suggest the present invention as recited in dependent claim 5. Independent claim 4 recites "a first camera for photographing a front of the flying ball." In addition, claim 5 recites "the first camera is positioned after a drop point." In view of this, claim 5 requires

that the first camera be "positioned after the drop point" and be "for photographing a front of the flying ball." Appellant respectfully submits that Nauck fails to disclose this aspect of the present invention and therefore, the combination of Lutz et al. and Nauck also fail to disclose this aspect of the present invention.

Referring to the Nauck reference, each of the cameras 21-25 is located in the target area. However, none of the cameras of Nauck are for photographing the front of a ball that drops short of a particular golf green (A-K). For example, referring to Figure 1 of Nauck, if a golfer were to hit a ball at the golf green A, the cameras 30, 31 and 32 would photograph the back of the ball and the camera 21 would photograph the side of the ball. However, the cameras 22-25, which are located after the drop point of the ball would not photograph the front of the ball, because each of these cameras is located too far down stream to photograph the front of the ball. Since Nauck fails to disclose a camera that is located after the drop point and photographs the front of a ball, Appellant respectfully submits that the combination of Lutz et al. and Nauck fails to teach or suggest the present invention as recited in dependent claim 5. Reconsideration and reversal of the Examiner's rejection of claim 5 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are therefore respectfully requested.

In addition, Appellant respectfully submits that the Examiner has not established a *prima facie* case of obviousness. Referring to MPEP 2143, the following is stated:

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined must teach or suggest all the claim limitations.

Appellant respectfully submits that the Examiner has failed to meet his burden in establishing a *prima facie* case of obviousness, since the Examiner has not provided any suggestion or motivation to modify the combination of references relied on. The Examiner must first establish a *prima facie* case of obviousness before the burden shifts to Appellant to rebut the *prima facie* case of obviousness. The Examiner is shifting the burden to Appellants to prove non-obviousness without first establishing obviousness.

Referring to paragraph 4 of MPEP 2142, the Examiner is placed with the initial burden "to provide some suggestion of the desirability of doing what the inventor has done." The Examiner must show that the references expressly or impliedly suggest the claimed invention or a convincing line of reasoning should be set forth as to why the modification is obvious. The Examiner has provided no suggestion or convincing line of reasoning in the present case. Accordingly, the Examiner's burden has not been satisfied.

Specifically, the Examiner's entire rationale for modifying the Lutz et al. reference is as follows:

... Nauck also discloses that the locator cameras can be placed at any convenient golf location from which a golf shot can be viewed (Nauck 3:35-37). Thus by combining the teachings of Nauck to Lutz an apparatus could be constructed to have various camera arrangements in relations to the launch and drop points on the golf area. (Examiner's final rejection, page 4, lines 13-17)(emphasis added).

Appellants submit that the fact that the cameras "can" be located at any convenient location and the fact that the Lutz et al. apparatus "could" be constructed in the manner suggested by the Examiner is insufficient to establish a *prima facie* case of obviousness. The references must suggest the desirability of the combination. The Examiner is directed to MPEP 2143.01 paragraph III, entitled "Fact that References Can be Combined or Modified is not Sufficient to Establish *Prima Facie* Obviousness."

At page 4, last paragraph of the Examiner's final rejection, the Examiner states the following:

One of ordinary skill in the art would be motivated to modify Lutz in view of Nauck to provide various camera arrangements with respect to the layout of the golf course and the launch and drop points. This would provide greater flexibility in setting up the tracking cameras on the golf course due to the fact that the system can be adapted to many different courses that are not of an identical layout.

However, this teaching does not appear in the Lutz et al. or Nauck references. In addition, Neither of the Lutz et al. and Nauck references disclose providing a camera down stream of the drop point, which is for photographing the front of ball. In view of this, this statement by the Examiner is insufficient to establish a *prima facie* case of obviousness.

Since the Examiner has not established a *prima facie* case of obviousness, Appellants respectfully request reconsideration and reversal of the Examiner's rejection of claim 5 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references.

Claim 8

At the outset, it is respectfully pointed out that claim 8 is dependent on dependent claim 5, which is dependent on independent claim 4 and is therefore allowable due to its dependence on dependent claim 5 and independent claim 4 for the above-mentioned reasons with regard to dependent claim 5 and independent claim 4.

In addition, claim 8 recites "wherein said first and second cameras are inclined upward from a horizontal direction, and an angle of inclination of said first camera is less than an angle of inclination of said second camera." Appellant respectfully submits that the Lutz et al. and Nauck references fail to render obvious claim 8 of the present

invention. This recitation in claim 8 can be clearly understood from a review of Figure 4 of the present invention, which illustrates the first camera 4 and the second camera 5 as being inclined by different amounts.

In the Examiner's final Office Action, the Examiner mentions claim 8 along with claims 7 and 11. Therefore, it is not understood whether the Examiner recognizes that claim 8 is dependent on claim 5, which is dependent on independent claim 4. Therefore, clarification of the Examiner's rejection is requested.

In any event, since claim 8 is dependent on claim 5, which is dependent on claim 4, claim 8 requires that the first camera (which is located after the ball drop point) and the second camera (which is located between the launch point and the drop point) be inclined from the horizontal by different amounts. Appellant respectfully submits that the Lutz et al. reference fails to disclose an embodiment as recited in dependent claim 8 of the present invention.

In the Examiner's final Office Action, at page 7, lines 6-8, the Examiner states "Lutz also discloses an embodiment of the apparatus wherein two cameras are positioned behind the launch point at different horizontal angles of inclination and multiple cameras that are positioned off to the side of the course." Since the Examiner uses the term "inclination," it appears that the Examiner has taken the position that Figure 1 of Lutz et al. is a side view and not a top view. However, Figure 1 is a plan (top) view as can be understood from column 3, lines 21-25 of Lutz et al. Taking the above into consideration, referring to Figure 1 of Lutz et al., all of the cameras 12a through 12d, 14a and 14b are oriented to have a horizontal line of sight. Therefore, there are no cameras

that can be considered first and second cameras that are inclined upward from the horizontal direction as recited in dependent claim 8.

Referring to Figures 5 and 6 of Lutz et al., each of these figures are plan views (see column 3, lines 32-39 of Lutz et al.). Therefore, none the cameras in Figures 5 and 6 are inclined upward from the horizontal direction as recited in dependent claim 8.

Referring to Figure 7, this figure is an elevational (side) view (see column 3, lines 40-43 of Lutz et al.). Therefore, the cameras 314a are oriented in a horizontal direction and the cameras 312a through 312d are oriented in a vertical direction. However, all of the cameras 312a through 312d are inclined from the horizontal direction by the same amount. Therefore, Figure 7 of Lutz et al. fails to disclose first and second cameras that are inclined upward from a horizontal direction, and wherein “an angle of inclination of said first camera is less than an angle of inclination of said second camera” as recited in dependent claim 8.

With regard to Figure 10, this figure is also a plan (top) view (see column 3, lines 50-53 of Lutz et al.). Therefore, all of the cameras are oriented in a horizontal plane. Camera 512 is rotatable about a vertical axis to scan the target area. Therefore, none the cameras in Figure 10 are inclined upward from the horizontal direction as recited in dependent claim 8.

With regard to the Nauck reference, each of the cameras 20-25 and 30-32 in Figure 1 are oriented in a horizontal direction. In view of this, Nauck fails to make up for the deficiencies of Lutz et al.

In view of the above, Appellant submits that the combination of Lutz et al. and Nauck is insufficient to teach or suggest the present invention as recited in dependent

claim 8. Therefore, reconsideration and reversal of the Examiner's rejection of claim 8 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are respectfully requested.

Claim 9

At the outset, it is respectfully pointed out that claim 9 is dependent on independent claim 1 and is therefore allowable due to its dependence on independent claim 1 for the above-mentioned reasons with regard to independent claim 1.

In addition, claim 9 recites "wherein the flying ball is photographed by only said first and said third camera during a first portion of the flight of the flying ball, said first, second and third cameras during a second portion of the flight of the flying ball, and only said second and third cameras during a third portion of the flight of the flying ball." Appellant respectfully submits that the Lutz et al. and Nauck references fail to render obvious claim 9 of the present invention.

Referring to Figure 6 of the Lutz et al. reference, for example, when the ball 22 is located upstream of the camera 212a, the ball 22 is photographed by the camera 214a and the camera 216 (the first and third cameras as recited in claim 9). When the ball 22 is within the field of view of the camera 212a, the ball 22 is photographed by cameras 214a, 212a and 216 (the first, second and third cameras of claim 9). However, when the ball leaves the field of view of the camera 212a (downstream of the camera 212a), the ball 22 is photographed by the cameras 214a and 216 (the first and third cameras). However, claim 9 recites that "only said second and third cameras" photograph the flying ball during the third portion of the flight. Since there is no point in time when only the

second and third cameras of Lutz et al. photograph the flying ball, Appellants submit that Lutz et al. fails to teach this aspect of the present invention.

With regard to the Nauck reference, since the cameras 30-31 are located in a horizontal plane and directed along the length of the target area, these cameras photograph the ball during the entire flight of the ball. In view of this, Nauck fails to disclose “only second and third cameras” photographing the flying balls during the third portion of the flight as recited in claim 9. Therefore, Nauck fails to make up for the deficiencies of Lutz et al.

In the Examiner’s final Office Action, at page 5, lines 15-22, the Examiner states the following:

...Nauck describes a method of handling off the tracking responsibilities of the cameras as the ball leaves Nauck also discloses that the locator cameras can be placed at any convenient golf location from which a golf shot can be viewed (Nauck 3:35-37). Since Nauck teaches that one can place the tracking cameras in any convenient location, one of ordinary skill in the art could easily construct a setup of camera’s wherein at given times during the trajectory of the ball, only the first and second camera, or only the second and third camera or all three cameras are able to photograph the ball. (emphasis added).

At the outset, it is respectfully pointed out that the fact that Nauck “can” or “could” be used to modify Lutz et al. is not sufficient motivation for obviousness. In addition, as explained above, neither of the Lutz et al. and Nauck references disclose locating the cameras so that only the second and third cameras photograph the flying ball during the third portion of the flight as recited in claim 9. In view of this, Appellant submits that the Examiner’s rejection is improper and should be withdrawn.

In view of the above, Appellant submits that the combination of Lutz et al. and Nauck is insufficient to teach or suggest the present invention as recited in dependent

claim 9. Therefore, reconsideration and reversal of the Examiner's rejection of claim 9 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are respectfully requested.

Claim 10

At the outset, it is respectfully pointed out that claim 10 is dependent on independent claim 4 and is therefore allowable due to its dependence on independent claim 4 for the above-mentioned reasons with regard to independent claim 4.

In addition, claim 10 recites "wherein the flying ball is photographed by only said third and said second camera during a first portion of the flight of the flying ball, said first, second and third cameras during a second portion of the flight of the flying ball, and only said first and third cameras during a third portion of the flight of the flying ball." Appellant respectfully submits that the Lutz et al. and Nauck references fail to render obvious claim 10 of the present invention.

Referring to Figure 6 of the Lutz et al. reference, for example, when the ball 22 is located upstream of the camera 212a, the ball 22 is photographed by the camera 214a and the camera 216 (the third and first cameras as recited in claim 10). However, claim 10 recites that "only said third and second cameras" photograph the flying ball during the first portion of the flight. Since there is no point in time when only the second and third cameras of Lutz et al. photograph the flying ball, Appellants submit that Lutz et al. fails to teach this aspect of the present invention.

With regard to the Nauck reference, since the cameras 30-31 are located in a horizontal plane and directed along the length of the target area, these cameras

photograph the ball during the entire flight of the ball. In view of this, Nauck fails to disclose “only said third and said second camera” photographing the flying ball during the first portion of the flight as recited in claim 10. Therefore, Nauck fails to make up for the deficiencies of Lutz et al.

In the Examiner’s final Office Action, at page 5, lines 15-22, the Examiner states the following:

...Nauck describes a method of handling off the tracking responsibilities of the cameras as the ball leaves Nauck also discloses that the locator cameras can be placed at any convenient golf location from which a golf shot can be viewed (Nauck 3:35-37). Since Nauck teaches that one can place the tracking cameras in any convenient location, one of ordinary skill in the art could easily construct a setup of camera’s wherein at given times during the trajectory of the ball, only the first and second camera, or only the second and third camera or all three cameras are able to photograph the ball. (emphasis added).

At the outset, it is respectfully pointed out that the fact that Nauck “can” or “could” be used to modify Lutz et al. is not sufficient motivation for obviousness. In addition, as explained above, neither of the Lutz et al. and Nauck references disclose locating the cameras so that only the third and second cameras photograph the flying ball during the first portion of the flight as recited in claim 10. In view of this, Appellant submits that the Examiner’s rejection is improper and should be withdrawn.

In view of the above, Appellant submits that the combination of Lutz et al. and Nauck is insufficient to teach or suggest the present invention as recited in dependent claim 10. Therefore, reconsideration and reversal of the Examiner’s rejection of claim 10 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are respectfully requested.

Claim 7

Independent claim 7 recites a combination of elements including "a calculating portion for calculating position coordinates of the ball based on image data obtained by the first, second and third cameras, and based on position coordinates, directions of optical axes and angles of view of the respective cameras." In addition, independent claim 7 recites "wherein the angle of view of the first camera partially overlaps with that of the second camera, the angle of view of the second camera is related to that of the first camera based on ball images which are simultaneously photographed by the first camera and the second camera." Appellant respectfully submits that Lutz et al. and Nauck fail to render obvious independent claim 7 of the present invention.

In independent claim 7, the angle of view of the first camera is related to that of the second camera based on the ball images. This has been explained in detail with regard to independent claims 1 and 4 above. Appellants respectfully submit that the Lutz et al. reference fails to disclose this aspect of the present invention for the same reasons mentioned above with regard to claims 1 and 4. Since Nauck fails to disclose the angle of view of the cameras being related to each other based on the ball images, Appellant respectfully submits that Nauck fails to make up for the deficiencies of Lutz et al.

In addition, independent claim 7 recites "wherein the first camera and the second camera are located at substantially the same distance, at the same elevation and directly behind the launch point, said first and second cameras are inclined upward from a horizontal direction, and an angle of inclination of said first camera is greater than an angle of inclination of said second camera." Appellant respectfully submits that the Lutz

et al. and Nauck references relied on by the Examiner fail to teach or suggest the present invention as recited in independent claim 7.

In the Examiner's final Office Action, at page 7, lines 6-14, the Examiner mentions an embodiment of Lutz et al. where "two cameras are positioned behind the launch point at different horizontal angles of inclination." Figures 1 and 9 of Lutz et al. are the only embodiments where two cameras are located behind the launch point. However, as mentioned above with regard to claim 8, Figure 1 is a plan view and therefore the cameras 14a and 14 b are oriented horizontally. In view of this, Figure 1 of Lutz et al. fails to disclose the recitation "said first and second cameras are inclined upward from a horizontal direction, and an angle of inclination of said first camera is greater than an angle of inclination of said second camera" as recited in independent claim 7. Since Nauck also fails to disclose any cameras that are inclined from the horizontal, Appellant respectfully submits that the combination of Lutz et al. and Nauck fails to render obvious independent claim 7 of the present invention.

At page 7, line 15 through page 7, line 2 of the Examiner's final Office Action, The Examiner recognizes that the embodiment of Figure 9 of Lutz et al. fails to disclose two cameras behind the launch point that are inclined upwardly from the horizontal. However, the Examiner relies on the Nauck reference to modify Lutz et al. to arrive at the presently claimed invention of claim 7. Appellants respectfully submit that the Nauck reference fails to make up for the deficiencies of Lutz et al. Specifically, Nauck fails to disclose any cameras that are inclined upwardly from the horizontal. Therefore, the Examiner's rejection is improper and should be withdrawn.

The Examiner relies on the fact that "Nauck discloses a camera tracking system wherein the cameras can be located in any convenient location for viewing a golf shot (Nauck 3:35-37)." However, this portion of Nauck (or any other portion of Nauck) does not disclose inclination of a camera. Therefore, Nauck fails to provide a sufficient teaching to incline the cameras of the Lutz et al. reference.

In view of the above, Appellant submits that the combination of Lutz et al. and Nauck is insufficient to teach or suggest the present invention as recited in independent claim 7. Therefore, reconsideration and reversal of the Examiner's rejection of claim 7 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are respectfully requested.

Claim 11

At the outset, it is respectfully pointed out that claim 11 is dependent on independent claim 7 and is therefore allowable due to its dependence on independent claim 7 for the above-mentioned reasons with regard to independent claim 7.

In addition, claim 11 recites "wherein a correspondence of the coordinates in the angle of view of the first camera to those in the angle of view of the second camera is grasped by the calculating portion." Appellant respectfully submits that the Lutz et al. and Nauck references fail to render obvious claim 11 of the present invention.

As explained above with regard to independent claims 1 and 4, the angle of view of the first and second cameras are related to each other based on ball images that are photographed at the same time. The calculating portion uses the correspondence of the

coordinates in the angle of view (which are related based on the ball images) to calculate the position coordinates of the ball.

In Lutz et al., the correspondence of the coordinates in the angle of view are not related based on the ball images. Therefore, Lutz et al. fails to teach this aspect of the present invention as recited in independent claim 7.

In view of the above, Appellant submits that the combination of Lutz et al. and Nauck is insufficient to teach or suggest the present invention as recited in dependent claim 11. Therefore, reconsideration and reversal of the Examiner's rejection of claim 11 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are respectfully requested.

Claim 12

At the outset, it is respectfully pointed out that claim 12 is dependent on independent claim 7 and is therefore allowable due to its dependence on independent claim 7 for the above-mentioned reasons with regard to independent claim 7.

In addition, claim 12 recites "wherein the flying ball is photographed by only said first and said third camera during a first portion of the flight of the flying ball, said first, second and third cameras during a second portion of the flight of the flying ball, and only said second and third cameras during a third portion of the flight of the flying ball." Appellant respectfully submits that the Lutz et al. and Nauck references fail to render obvious claim 12 of the present invention.

Referring to Figure 6 of the Lutz et al. reference, for example, when the ball 22 is located upstream of the camera 212a, the ball 22 is photographed by the camera 214a and

the camera 216 (the first and third cameras as recited in claim 9). When the ball 22 is within the field of view of the camera 212a, the ball 22 is photographed by cameras 214a, 212a and 216 (the first, second and third cameras of claim 9). However, when the ball leaves the field of view of the camera 212a (downstream of the camera 212a), the ball 22 is photographed by the cameras 214a and 216 (the first and third cameras). However, claim 12 recites that “only said second and third cameras” photograph the flying ball during the third portion of the flight. Since there is no point in time when only the second and third cameras of Lutz et al. photograph the flying ball, Appellants submit that Lutz et al. fails to teach this aspect of the present invention.

With regard to the Nauck reference, since the cameras 30-31 are located in a horizontal plane and directed along the length of the target area, these cameras photograph the ball during the entire flight of the ball. In view of this, Nauck fails to disclose “only second and third cameras” photographing the flying balls during the third portion of the flight as recited in claim 12. Therefore, Nauck fails to make up for the deficiencies of Lutz et al.

In the Examiner’s final Office Action, at page 5, lines 15-22, the Examiner states the following:

...Nauck describes a method of handling off the tracking responsibilities of the cameras as the ball leaves Nauck also discloses that the locator cameras can be placed at any convenient golf location from which a golf shot can be viewed (Nauck 3:35-37). Since Nauck teaches that one can place the tracking cameras in any convenient location, one of ordinary skill in the art could easily construct a setup of camera’s wherein at given times during the trajectory of the ball, only the first and second camera, or only the second and third camera or all three cameras are able to photograph the ball. (emphasis added).

At the outset, it is respectfully pointed out that the fact that Nauck “can” or “could” be used to modify Lutz et al. is not sufficient motivation for obviousness. In addition, as explained above, neither of the Lutz et al. and Nauck references disclose locating the cameras so that only the second and third cameras photograph the flying ball during the third portion of the flight as recited in claim 12. In view of this, Appellant submits that the Examiner’s rejection is improper and should be withdrawn.

In view of the above, Appellant submits that the combination of Lutz et al. and Nauck are insufficient to teach or suggest the present invention as recited in dependent claim 11. Therefore, reconsideration and reversal of the Examiner’s rejection of claim 11 under 35 U.S.C. § 103(a) in view of the Lutz et al. and Nauck references are respectfully requested.

In view of the above remarks, Appellant respectfully submits that claims 1, 2, 4, 5 and 7-12 clearly define the present invention over the Lutz et al. and Nauck references. Reconsideration and reversal of the Examiner’s rejections under 35 U.S.C. §§ 102 and 103 are therefore respectfully requested.

VIII. CLAIMS

A copy of the claims involved in the present appeal is attached hereto as Appendix A.

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Respectfully submitted,

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Attachments: Claims Appendix

APPENDIX A

1. A ball trajectory measuring apparatus comprising:
 - a first camera for photographing a flying ball from a back of the flying ball;
 - a second camera having an angle of view related to that of the first camera and serving to photograph the back of the flying ball later than the first camera;
 - a third camera for photographing a front of the flying ball;
 - a control portion for controlling photographing timings of the first, second and third cameras; and
 - a calculating portion for calculating position coordinates of the ball based on image data obtained by the first, second and third cameras, and based on position coordinates, directions of optical axes and angles of view of the respective cameras,wherein the angle of view of the first camera partially overlaps with that of the second camera, the angle of view of the second camera is related to that of the first camera based on ball images which are simultaneously photographed by the first camera and the second camera, and a correspondence of the coordinates in the angle of view of the first camera to those in the angle of view of the second camera is grasped by the calculating portion.

2. The ball trajectory measuring apparatus according to claim 1, wherein the first camera is positioned behind a ball launch point, the second camera is positioned between the launch point and a drop point, and the third camera is positioned after the drop point.

3. (Canceled)

4. A ball trajectory measuring apparatus comprising:

a first camera for photographing a front of a flying ball;

a second camera having an angle of view related to that of the first camera and serving to photograph the front of the flying ball earlier than the first camera;

a third camera for photographing a back of the flying ball;

a control portion for controlling photographing timings of the first, second and third cameras; and

a calculating portion for calculating position coordinates of the ball based on image data obtained by the first, second and third cameras, and based on position coordinates, directions of optical axes and angles of view of the respective cameras,

wherein the angle of view of the first camera partially overlaps with that of the second camera, the angle of view of the second camera is related to that of the first camera based on ball images which are simultaneously photographed by the first camera and the second camera, and a correspondence of the coordinates in the angle of view of the first camera to those in the angle of view of the second camera is grasped by the calculating portion.

5. The ball trajectory measuring apparatus according to claim 4, wherein the first camera is positioned after a ball drop point, the second camera is positioned between a launch point and the drop point, and the third camera is positioned behind the launch point.

6. (Canceled)

7. A ball trajectory measuring apparatus comprising:

a first camera for photographing a flying ball from a back of the flying ball;

a second camera having an angle of view related to that of the first camera and serving to photograph the back of the flying ball later than the first camera;

a third camera for photographing a front of the flying ball;

a control portion for controlling photographing timings of the first, second and third cameras; and

a calculating portion for calculating position coordinates of the ball based on image data obtained by the first, second and third cameras, and based on position coordinates, directions of optical axes and angles of view of the respective cameras,

wherein the angle of view of the first camera partially overlaps with that of the second camera, the angle of view of the second camera is related to that of the first camera based on ball images which are simultaneously photographed by the first camera and the second camera, and

wherein the first camera and the second camera are located at substantially the same distance, at the same elevation and directly behind the launch point, said first and second cameras are inclined upward from a horizontal direction, and an angle of inclination of said first camera is greater than an angle of inclination of said second camera.

8. The ball trajectory measuring apparatus according to claim 5, wherein said first and second cameras are inclined upward from a horizontal direction, and an angle of inclination of said first camera is less than an angle of inclination of said second camera.

9. The ball trajectory measuring apparatus according to claim 1, wherein the flying ball is photographed by only said first and said third camera during a first portion of the flight of the flying ball, said first, second and third cameras during a second portion of the flight of the flying ball, and only said second and third cameras during a third portion of the flight of the flying ball.

10. The ball trajectory measuring apparatus according to claim 4, wherein the flying ball is photographed by only said third and said second camera during a first portion of the flight of the flying ball, said first, second and third cameras during a second portion of the flight of the flying ball, and only said first and third cameras during a third portion of the flight of the flying ball.

11. The ball trajectory measuring apparatus according to claim 7, wherein a correspondence of the coordinates in the angle of view of the first camera to those in the angle of view of the second camera is grasped by the calculating portion.

12. The ball trajectory measuring apparatus according to claim 7, wherein the flying ball is photographed by only said first and said third camera during a first portion of the flight of the flying ball, said first, second and third cameras during a second portion

of the flight of the flying ball, and only said second and third cameras during a third portion of the flight of the flying ball.